REMARKS

Responsive to the Office Action dated April 15, 2005, applicant has amended claims 1, 5, 6, 9, 12, 13 and 14 and cancelled claim 2. Reconsideration of all grounds of rejection is respectfully requested in the light of the foregoing amendments and the following remarks.

On page 2 of the Office Action, the Examiner objected to claims 2, 5 - 8 and 14 for informalities. Claim 2 has been cancelled. Claims 5, 6, and 14 have been amended, as suggested by the Examiner. The Examiner did not point out any informality in claims 7 or 8. Independent claims 9 and 13 have been amended to specify that the claimed process is continuous.

In paragraph 3 of the Office Action the Examiner rejected claim 12 under 35 USC §112. Claim 12 is dependent from claim 9. Basically, claim 9 defines a process in which the aspect ratio of the fibers is continuously monitored and if the aspect ratio is below first selected value, the alum level is increased. Alternatively, if aspect ratio is greater than second value, the alum level is decreased. Claim 12 has been amended to adopt the language of claim 13 wherein the second value is "no greater than about 50:1." It is submitted that thus amendment overcomes the §112 rejection of claim 12.

On page 3 of the Office Action, the examiner rejected claim 1 under 35 USC §102 as anticipated by US Patent 5,320,677 to Baig. All of the independent

claims in this case are set forth in "Jepsen" format, wherein the acknowledged prior art is set forth in the preamble of the claim (in this case Baig is the acknowledged prior art) and the patentable improvement over the prior art is set forth in the "improvement" portion of the claim.

The Baig process includes 4 essential steps that are set forth in the preamble of the independent claims. First, a slurry of water, gypsum and cellulose fiber is heated under pressure to form acicular calcium sulfate hemihydrate crystals. Second, the slurry is dewatered. Next, the dewatered slurry is shaped. Finally, the hemihydrate crystals in the shaped slurry are rehydrated back to gypsum.

Claim 1 was designed to broadly cover the discovery that certain inorganic crystal modifiers could be used to reduce the time and or temperature of the Baig heating step. As the Examiner pointed out in the Office Action, Baig suggests the use of organic acids as crystal modifiers. Accordingly, claim 1 has been amended to insert the Markush group of inorganic crystal modifiers from claim 2 into claim 1 and claim 2 has been cancelled. It is submitted that thus amendment overcomes the §102 rejection of claim 1.

On page 4 of the Office Action the Examiner rejected claims 2, 5 and 6 under 35 USC §103 as being obvious based on US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al. It is understood that this rejection will apply to amended claim 1. Independent Claim 1, as amended, sets forth a

Markush group of inorganic crystal modifiers that may be used to reduce the calcining temperature or time. Independent claim 5 sets forth the use of the same Markush group of crystal modifiers that may be used to increase the aspect ratio of the hemihydrate crystals. Claim 6 is dependent from claim 5 and specifies a minimum aspect ratio of at least 5:1.

US Patent 5,320,677 to Baig discloses the process set forth in the preamble portion of all of the applicants' independent claims.

US Patent 3,835,219 to Jaunarajs et al is directed to a method of preparing fibrous soluble calcium sulfate anhydrite. The Jaunarajs et al method does not contemplate the formation of calcium sulfate fibers in the presence of cellulose fibers, as required by applicants' claims. The Jaunarajs et al patent states the process selectively produces fibrous soluble anhydrite "to the virtual exclusion of non-fibrous anhydrite, insoluble anhydrite, and/or hemihydrate" (Col. 2, lines 18-20). The Jaunarajs et al anhydrite fibers are used to reinforce a variety of organic polymeric resins (Col. 4, lines 17 – 20).

Jaunarajs et al also describes the use of "crystal habit modifiers" that are "suitable for the formation of the fibrous soluble anhydrite." (See Col.1, lines 66-67 and Col. 3, lines 11-12). Most of the of "crystal habit modifiers" disclosed by Jaunarajs et al are organic acids, although Jaunarajs et al lists some inorganic modifiers that fall within applicants' Markush group. However, Jaunarajs et al does not state the function of "crystal habit modifiers." Apparently, the "crystal

habit modifiers" promote the formation fibrous soluble anhydrite "to the virtual exclusion of non-fibrous anhydrite, insoluble anhydrite, and/or hemihydrate". There is no suggestion that these "crystal habit modifiers" reduce the time and/or temperature of the calcining process (as required by applicants' claim 1). Similarly, there is no suggestion that these "crystal habit modifiers" could be used to adjust the aspect ratio of the calcium sulfate fibers (as required by applicants' claims 5 and 6).

Further, the soluble fibrous calcium sulfate anhydrite produced by the Jaunarajs et al process would not be suitable for use in the Baig process. As is explained above, the process recited in applicants' independent claims requires the acicular calcium sulfate alpha hemihydrate crystals to be de-watered. In the dewatering step, any water soluble materials in the slurry would be removed along with the water. If the soluble fibrous calcium sulfate anhydrite fibers of Jaunarajs et al were used in the Baig process, the soluble calcium sulfate fibers would be removed with the excess water in the dewatering step. The result would be that the Jaunarajs et al the calcium sulfate fibers would not be in the final product. The solubility of the fibrous calcium sulfate anhydrite produced by the Jaunarajs et al process would not be a problem in reinforcing a polymeric resin, but a soluble fibrous calcium sulfate anhydrite would not be suitable for use in applicants' process.

Still further, the fibrous soluble calcium sulfate anhydrite produced by the Jaunarajs et al process is not suitable for use in the Baig process. The last step of the Baig process set forth in applicants' claims is to rehydrate the acicular calcium sulfate alpha hemihydrate crystals back to gypsum to bond the cellulose fibers into a composite material. In plastics manufacturing, the anhydrite is merely an inert reinforcing filler in the composite and not an integral component as in the applicant's process. As a practical matter, the rehydration step in applicants' process must take place within a short time. It is well known that most forms of calcium sulfate anhydrite are difficult to rehydrate quickly and some forms of anhydrite do not rehydrate at all. Accordingly, the fibrous calcium sulfate anhydrite product of Jaunarajs et al would be difficult or impossible to use in the rehydration step of the Baig process of applicants' claims because the rate of rehydration must synchronized with other steps of the process steps to achieve satisfactory final composite properties (e.g. see US Patent No.: 6,197,235 B1, Figure 6, Claim 9, 16, etc.).

It is submitted that claims 2, 5 and 6 are not obvious under 35 USC §103 based on US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al. Jaunarajs et al teach a process of making soluble calcium sulfate anhydrite fibers – to the exclusion of hemihydrate fibers required by applicants' claims. As is explained above, neither soluble fibers nor anhydrite fibers would be suitable for use in applicants' claimed process. Jaunarajs et al teaches the use of "crystal

habit modifiers" in the process, but does not suggest the "crystal habit modifiers" reduces either the time or temperature to carry out the calcination process or increases the aspect ratio of the fibers, as required by applicants' claims. Accordingly, reconsideration of the rejection of claims 2, 5 and 6 under 35 USC §103 as being obvious based on US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al is requested.

On page 5 of the Office Action the Examiner rejected claims 3, 4, 7 and 8 under 35 USC §103 as being obvious based on US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al. Claims 3 and 4, which are dependent from claim 1, specify the amount of crystal modifier used. Claims 7 and 8, which are dependent from claim 5, also specify the amount of crystal modifier used. It is submitted that the combination of US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al fails to make obvious claims 3, 4, 7 and 8 for the same reasons the combination fails to make obvious claims 2, 5 and 6.

The fact that Jaunarajs et al uses the same level of "crystal habit modifiers" as set forth in applicants' claims does overcome the failure of Jaunarajs et al to teach the use of a modifier to reduce the time/temperature of the calcination or to increase the aspect ratio of the crystals. Again, Jaunarajs et al disclose a process of making soluble calcium sulfate anhydrite fibers that would be unsuitable for use in applicants' claimed process. Accordingly, reconsideration of the rejection of claims 3, 4, 7 and 8 under 35 USC §103 as

being obvious based on US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al is requested.

On pages 5 to 7 of the Office Action the Examiner rejected claims 9 through 14 under 35 USC §103 as being obvious based on US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al. All of these claims are directed to a process in which the alum is included in the water, gypsum and cellulosic fiber slurry that is fed into the autoclave During the process, the aspect ratio of the hemihydrate emerging from the autoclave is continuously monitored and the process is controlled by adjusting the level of the alum to maintain the aspect ratio within selected a range. All of these claims have been amended to specifically require that the process is continuous and that the monitoring is also continuous. The claims as filed required a monitoring step which clearly implied that the process was continuous. The specification clearly teaches the continuous nature of the claimed process, e.g. Paragraphs 14, 19 and 27. It is submitted that this amendment addresses the issue raised by the Examiner in the paragraph bridging pages 6 and 7 of the Office Action, in that real-time monitoring during the process is required by the claims, as amended.

Jaunarajs et al fails to suggest that alum can control the aspect ratio of acicular calcium sulfate alpha hemihydrate crystals. Jaunarajs et al teach that the "crystal habit modifiers" (which may be aluminum sulfate) promote the formation of soluble anhydrite fibers – which are unsuited for applicants' purposes.

Alum is common accelerator used to promote the rehydration of calcium sulfate hemihydrate to gypsum. As such, it would not be obvious to those skilled in the art to put alum in a gypsum slurry that is to be dehydrated in a calcination process. Moreover, because alum is water soluble, it would not be obvious to add alum as a hydration accelerator to the slurry before it goes through the dewatering step of the Baig process. One skilled in the art would expect the alum and any other water-soluble materials to be removed in the dewatering step of the Baig process. As is pointed out in applicants' specification (pages 10 and 11) the alum is not lost in the dewatering step but is retained in applicants' final product. This is further evidence of the unobviousness of applicants' claims 9 through 14, not addressed by Jaunarajs et al.

Jaunarajs et al teaches the production of soluble fibers of calcium sulfate anhydrite using a batch process. Claims 9 through 14 require the continuous of monitoring the aspect ratio, which is not suggested by the prior art. The fact that Jaunarajs et al lists aluminum sulfate as a "crystal habit modifiers" does overcome its failure to suggest a modifier can control the aspect ratio of the calcium sulfate fibers. Again, Jaunarajs et al teach a process of making soluble calcium sulfate anhydrite fibers that would be unsuitable for use in applicants' claimed process. Accordingly, reconsideration of the rejection of claims 9 through 14 under 35 USC §103 as being obvious based on US Patent 5,320,677 to Baig and US Patent 3,835,219 to Jaunarajs et al is requested.

CONCLUSION

It is submitted that the claims, as amended, are patentable over the prior art. Reconsideration of all grounds of rejection is respectfully requested for the reasons set for the in the foregoing remarks.

Respectfully submitted,

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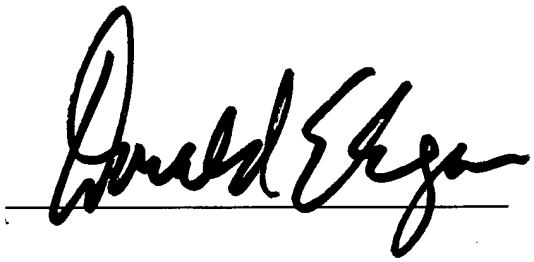

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